



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

A CO-OPERATIVE INVESTIGATION IN THE TESTING AND EXPERIMENTAL TEACHING OF FIRST-YEAR ALGEBRA

H. O. RUGG

School of Education, University of Chicago

AND

J. R. CLARK

Parker High School, Chicago

In the *School Review* for February and March, 1917, the present writers announced plans for the complete revision and reprinting of the "Standardized Tests in First-Year Algebra." We now wish to announce that these tests have been revised and reprinted in the light of careful experimentation, and that they are now being distributed, at cost, by the School of Education, University of Chicago, Chicago, Illinois. Samples of these tests will be sent without charge to teachers and administrators who request them.

In their complete form the tests cover sixteen fundamental operations. In addition, there are two preliminary tests which can be given prior to the formal testing to familiarize pupils with the routine of taking "time" tests. The formal tests are printed in compact, easily handled form, as follows: Tests I-IX inclusive and X-XIV inclusive are printed in two $4\frac{1}{2}'' \times 7''$ booklets, and each booklet is planned so as to fit a class exercise of forty minutes. Tests XV ("Graphs") and XVI ("Quadratic Equations with Irrational Roots") are supplementary tests on single sheets that can be given to those pupils who have completed that work. The verbal tests are in the form of lists of "translation" problems, the difficulty of each of which has been scored, and which can be put together easily, in a test, by the teacher. The tests have now been made to include each of the fundamental operations shown in list on p. 347, which have to be mastered in first-year algebra.

The *price* of the tests has now been set at *4 cents per set*. This price merely covers the expense of printing and handling. The tests have been designed primarily in the interest of improving the

teaching of algebra. No profit is being made on them. In ordering tests, order a set for each pupil. A set includes (1) Books I and II, containing Tests I–XIV; (2) Supplementary Tests XV and XVI on single sheets; (3) Preliminary Tests A and B. With each order will be included in sufficient quantities (1) complete printed directions for giving and scoring the tests; (2) printed score sheets for records of individual pupils; (3) printed class-record sheets on which class averages can be computed easily; (4) tentative standard scores obtained with these tests in 27 school systems; (5) lists of verbal problems which have been scored for difficulty.

BOOK I		BOOK II	
Test No.	Operation	Test No.	Operation
1.....	Collecting terms	10.....	Fractional equations
2.....	Substitution	11.....	Practical formulae
3.....	Subtraction	12.....	Quadratic equations
4.....	Simple equations	13.....	Simultaneous equations
5.....	Parentheses	14.....	Radicals
6.....	Special products		
7.....	Exponents		Supplementary Tests
8.....	Factoring	15.....	Graphs
9.....	Clearing fractions	16.....	Quadratic equations (irrational roots)

The chief function of standardized tests is that of “diagnosis.” They enable us to locate easily and definitely the difficulties which our pupils encounter in learning algebra. A complete source list of such difficulties can be found in the *School Review* for March, pp. 207–10.

ANNOUNCEMENT OF CO-OPERATIVE EXPERIMENT IN TEACHING ALGEBRA

It was pointed out in the *School Review* articles that the design and giving of standardized tests merely paves the way for the experimental teaching of algebra. During the past year the writers have been designing and trying out various methods of using practice exercises for the perfecting of skill in the formal operations. By the end of the present school year a complete plan will be ready for those who wish to undertake a co-operative study of “best ways of teaching first-year algebra.” During the first year of the study attention must be centered largely on the perfecting of

habits in manipulating the formal operations. A system of practice exercises has been developed from classroom experimentation. These will be sold at cost at the beginning of the next school year. The exact use of these in the presentation and habitualizing of the formal operations will be set forth in the "Experimental Plan" which will be sent to those who are interested in co-operating. The co-operative study will include: definite teaching problems concerning methods of presenting various operations; the best time to introduce formal practice material for the perfection of skill in each operation; the optimum amount of time to be given to formal drill; the determination of the most effective number of recurring drills on each operation and the elapsed time between them; the recurring use of the Standardized Tests throughout the school year (for this purpose the tests will be printed and sold on separate sheets at the lowest possible price). It is clearly recognized that the largest emphasis must be placed on the reasoning side of learning algebra. In order to make progress in that direction, we must first answer these important questions concerning the perfecting of the tool processes. As soon as definite results appear from the use of the formal material, the attention of the investigation will be centered on the application of formal skill to the solution of reasoning problems. We shall not lose sight of the ultimate aim of teaching our subject, but at the same time we shall recognize clearly that our first job is to determine ways and means of raising the present low degree of skill that our pupils exhibit in using the formal operations. If you are interested in this co-operative experiment address H. O. Rugg, School of Education, University of Chicago, for information. It will be sent before the end of the school year.

ROUND TABLES ON THE TEACHING OF ALGEBRA

Personal conferences or "round tables" of those collaborating in this study will be held at various centers throughout the country, beginning with the next school year. For those situated near Illinois, the first of these conferences can be announced definitely to be held in connection with the University of Illinois High School Conference at Urbana, Illinois, in November, 1917. At these round tables specific questions of teaching, problems and issues

arising in the carrying on of the experimental study, will be discussed by those who are taking part. The aim is to make these conferences real "clearing-houses" for the best thought of progressive teachers of algebra on their own classroom problems. Those who are now giving their time to the carrying on of this work desire to get an expression of opinion concerning the best places and times of meeting for such round-table conferences in various portions of the country.

STANDARDIZING THE DIFFICULTY OF VERBAL PROBLEMS

The writers need the immediate co-operation of many algebra teachers to standardize the difficulty of large numbers of verbal problems. *Who will devote one period of his class time within the next month to the giving of a list of verbal problems to his pupils?* Please write us if you can help, stating the number of pupils in your classes. We will bear all expense. You will be asked to do nothing but to give the problems to your pupils in accordance with our directions, and to return the papers to us.

STANDARDIZED TESTS MUST NOT BE COMMERCIALIZED

In closing this announcement may we not urge the co-operation of teachers generally in combating *the present tendency to commercialize testing and practice material?* *The measuring and experimental movement* probably is the most promising movement for the improvement of school practice that we have seen in our own day. *It must not be commercialized!* This point is emphasized in view of the recent tendency to sell for profit so-called "standard" tests and "scales." Tests are being printed and distributed in large quantities *for profit*—tests which have not been subjected to careful and critical analysis, and about the details of the derivation of which the educational public knows little and can find out little. *It is reported definitely that this is to be done in algebra!* Tests that have been carefully and truly "standardized" provide us with a most valuable experimental device for the improvement of teaching. Tests that are not "standardized"—that is, those for which it is not known exactly what they measure and how they measure it—pretend to do something which they do not do. This must be detrimental to the advancement of the movement for the experimental study of teaching problems.